

## Trussed TRAC Boom for Solar Sails, Phase I

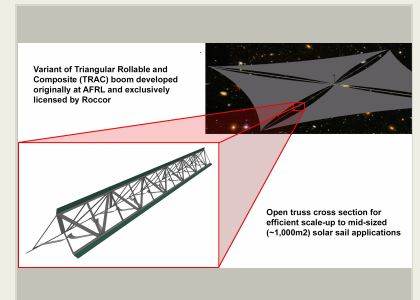
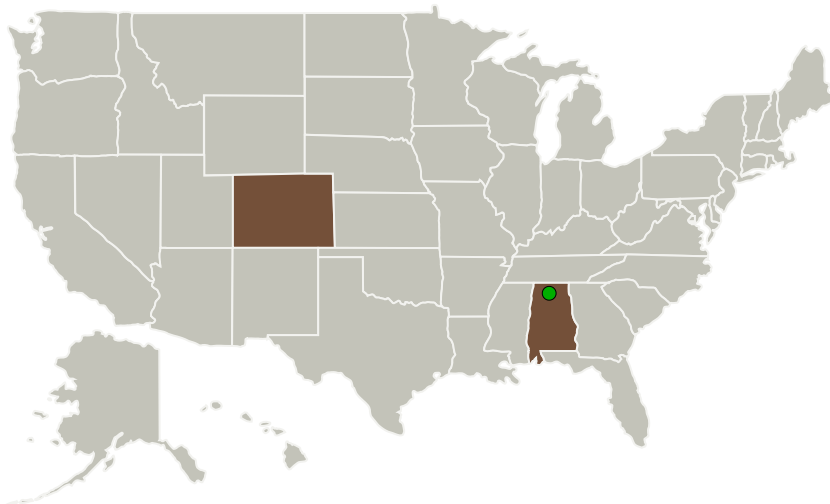
Completed Technology Project (2017 - 2017)



## Project Introduction

In response to NASA's need for low-cost deployable solar sail booms for mid-size ( $\sim 1,000\text{m}^2$ ) solar sails, Rocco proposes to develop the composite Trussed TRAC (T-TRAC) Boom system. Like the original TRAC boom, T-TRAC has a triangular cross section that flattens and rolls around a spool for packaging. Unlike TRAC, T-TRAC is applicable to much larger scale boom designs. The proposed design will advance TRAC technology through: 1) scaling up the cross-section size and length of the boom, 2) light weighting the boom through material re-distribution and removal, and 3) cross-section modification for enhanced strength. Preliminary analyses indicate these steps will achieve more than a 5X increase in TRAC Boom structural mass efficiency over recently developed high performance composite TRAC Booms, while maintaining an extremely compact roll stowed configuration that maintains heritage with NASA's solar sail mechanical architecture lineage. The overarching Phase I objective is to conduct a preliminary design-analysis-fabrication-test loop for a T-TRAC boom capable of meeting requirements for NASA's future mid-sized solar sail mission. Multi-scale micro-mechanics, laminate, cross-section, and full section analyses will be performed to quickly narrow the laminates and boom designs to a few candidates. These efforts will necessarily be performed in close communication with material vendors to select a few laminates for short coupon testing prior to building proof-of-concept booms. During Phase II, a four-boom T-TRAC solar sail system will be developed, and prototype units will be built and tested to establish performance for missions of interest to NASA.

## Primary U.S. Work Locations and Key Partners



Trussed TRAC Boom for Solar Sails, Phase I Briefing Chart Image

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## Trussed TRAC Boom for Solar Sails, Phase I

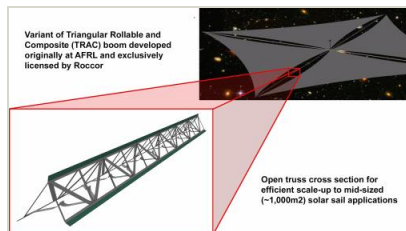
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Organizations Performing Work	Role	Type	Location
Roccor, LLC	Lead Organization	Industry	Longmont, Colorado
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Colorado

## Images



## Briefing Chart Image

Trussed TRAC Boom for Solar Sails,  
Phase I Briefing Chart Image  
(<https://techport.nasa.gov/image/130769>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Roccor, LLC

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

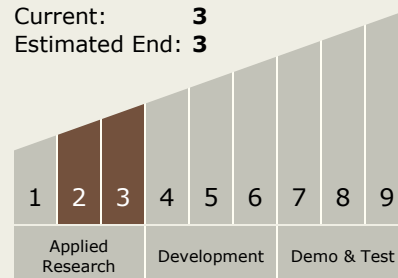
Carlos Torrez

## Principal Investigator:

Dana Turse

## Technology Maturity (TRL)

Start: 2  
Current: 3  
Estimated End: 3



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### Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - └ TX01.4 Advanced Propulsion
    - └ TX01.4.1 Solar Sails